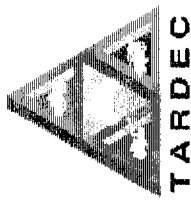


Automated 2D to 3D CAD Conversions – Myth or Reality?

Dr. Raj Iyer
Tank Automotive Research Development &
Engineering Center (TARDEC)
US Army R&D Command
Warren, MI



Presented at the SME WESTEC 2004 – New Frontiers in Manufacturing
Technology Conference, Los Angeles, CA

March 24, 2004

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Outline

- Need to move to 3D
- Issues with legacy data
- Decision factors
- Methodology
- Conversion issues
- Demos
- Conclusions

Legacy data

- Paper and Mylar drawings
- Scanned raster images
- 2D CAD vector files
- 3D “dumb” solid models

Need to move to 3D

- Large holdings of legacy 2D drawings
- Redesign (or design new) parts based on older designs
- Manufacture spare parts using new machine tools– improved logistic support
- Archive designs for future use
- Visualize 3D models for non-engineering use
- Virtual prototyping – engineering analysis

Issues with legacy data

- Scanned images
 - Poor scanning resolution
 - Poor quality of hardcopy drawings
 - Multiple sheets because of scanner restrictions
 - Need to be vectorized first
- Vectorized drawings
 - Duplicate and overlapping edges
 - Disconnected and crisscrossing edges
 - Near zero length entities
 - Breakup of entities
 - Incorrect scale factor
 - Ambiguous dimensions

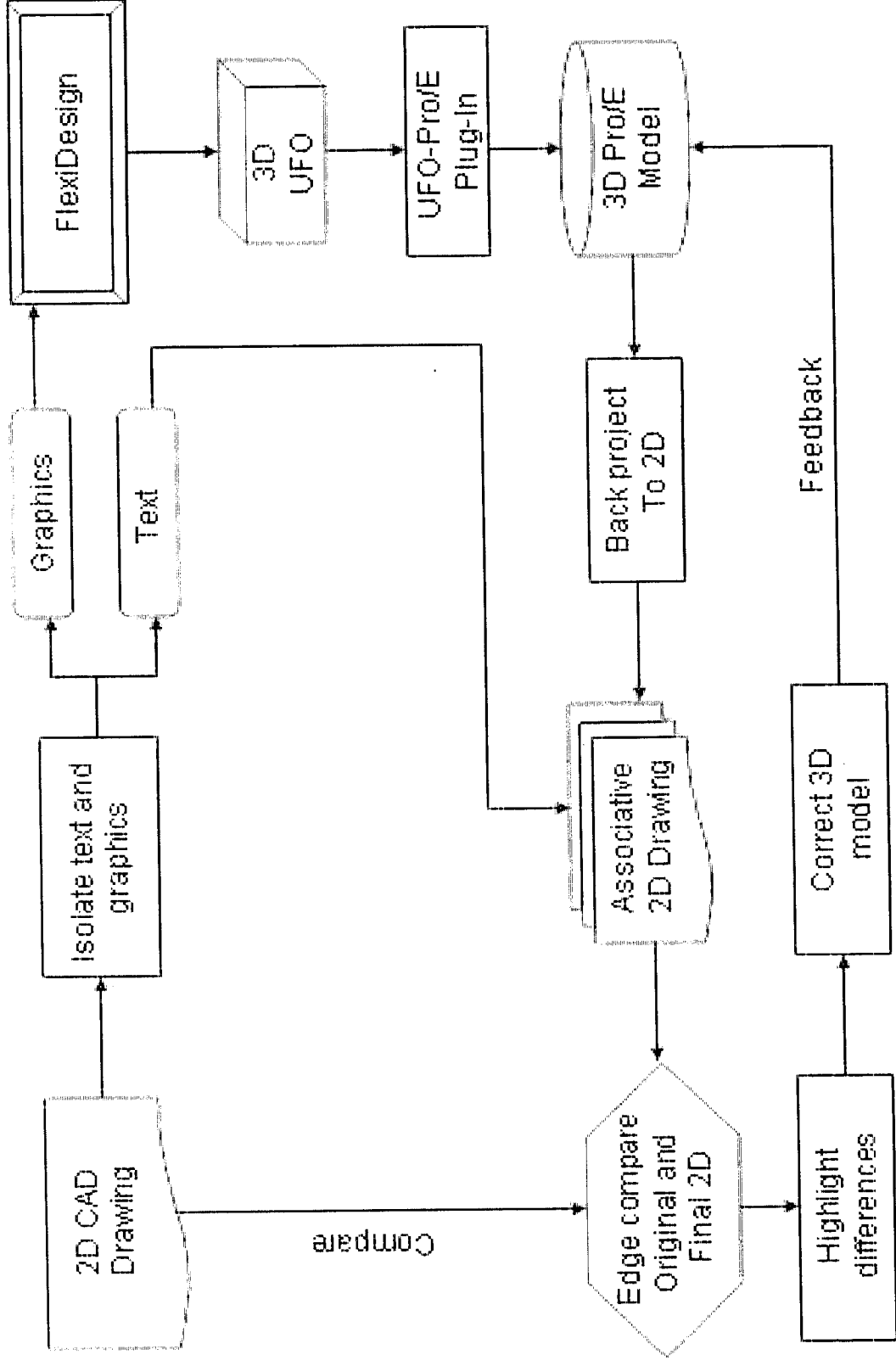
Conversion decision factors

- Future production quantities
- Remaining product lifecycle
- Potential for design changes
- Availability and quality of technical data package (TDP)
- Mechanical content
- System density

Available software solutions

- AutoBuildZ (PTC)
- SolidEdge (UGS)
- FlexiDesign (ASPIre3D)

Conversion methodology



Conversion issues

- Works best with machinable piece parts
- Cannot handle assembly drawings
- Design intent
- Preprocessing and post-processing needed
- Automated vs. interactive
- Availability and completeness of data
- Pro/ENGINEER API issues
- Carryover of notes and non-geometric information

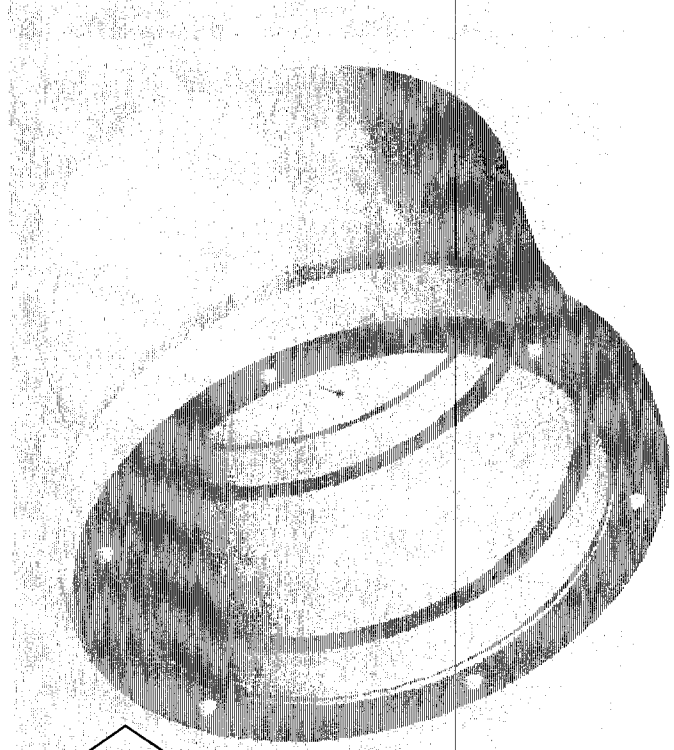
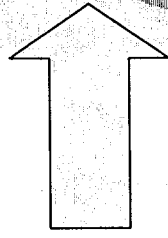
Process issues

- Can we mandate 3D across the enterprise?
- How to make 3D the official legal document for procurement?
- Do we need to hold on to the 2D?
- How do we manage raster, 2D and 3D concurrently?
- How do we interface with the PDM?
- Are our suppliers capable of handling 3D exclusively?
- Do we have rights to the contractor's design data?

Potential savings

- Automated conversions 4-5 times faster than manual conversions based on pilot conversions
- May not require engineers or 3D modeling experts
- In-house conversions on an as-needed basis possible
- Flexibility in outputs – Pro/E, Catia, UG, SolidWorks
- Lower costs in procuring and manufacturing parts by providing supplier with CAD data that they can directly use

Demos



In summary

- Cost-saving automated software are becoming available and affordable today
- Take advantage of cost/time savings that automated software provides
- Not a 100% solution – but definite productivity improvements over manual conversion approaches

Contact

- Any Questions?
- For more information:
 - Dr. Raj Iyer
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 - Warren, MI 48313
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 - <http://www.tardec.army.mil>

13974

Alfatar, Marsha 'CONTR'

From: Alfatar, Marsha 'CONTR'
Sent: Monday, January 26, 2004 10:53 AM
To: Iyer, Raj G.
Subject: OPSEC Review

Dr. Iyer:

The OPSEC Review on your briefing #13974 "Automated 2D to 3D CAD Conversions -- Myth or Reality?" is complete. A PDF copy of the OPSEC Review Certification is attached.

To archive your briefing with the Defense Technical Information Center (DTIC), Fort Belvoir, I need for you to complete a Form 298 -- also attached. I will then submit your briefing to DTIC and contact you when they have assigned an archival number -- it a about a six week process.

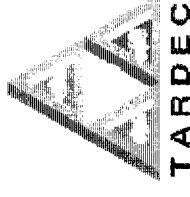
If you have any questions please contact me -- my hours are listed below.

Marsha

Marsha Alfatar
 Contracted Coordinator
 TARDEC Technical Information Center (TIC)
 AMSRD-TAR-O (MS 204)
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 The TIC is located in Building 200C
 Just South of the Media Center

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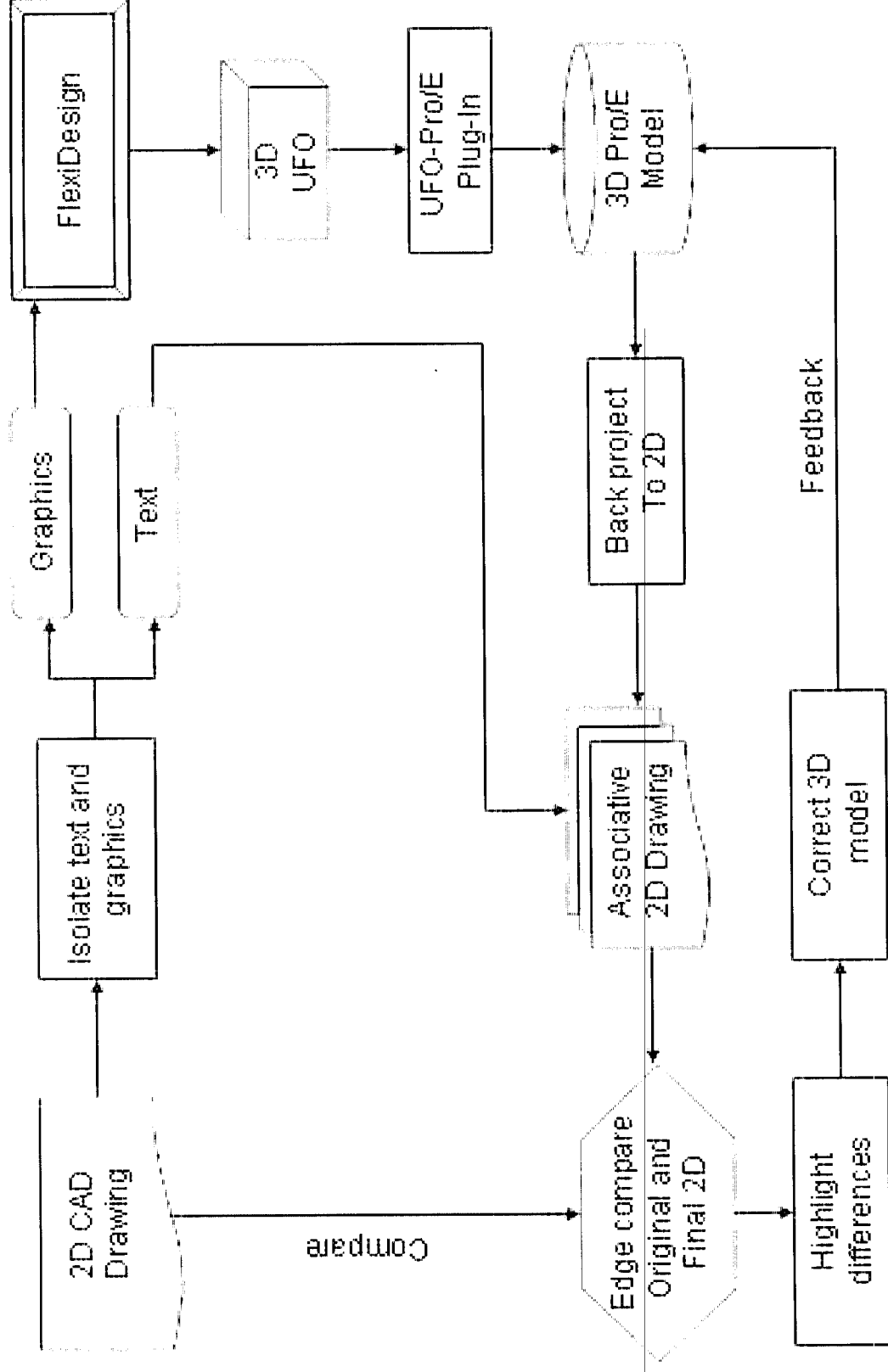
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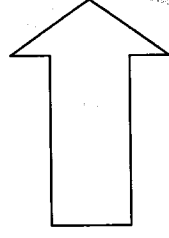
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